eOftalmo
http://eoftalmo.org.br

NARRATIVE LITERATURE REVIEW

Literature Review on the Application of Telemedicine in Subnormal Vision

Revisão de Literatura de aplicação de Telemedicina em Visão Subnormal

Revisión de Literatura de Aplicación de Telemedicina en Visión Subnormal

Elaine Fonseca Bastos Goulart – Fundação Oswaldo Cruz/ Escola Nacional de Saúde Pública/ Núcleo de Tecnologia e Logística em Saúde, Rio de Janeiro, RJ. draelainegoulart@gmail.com
Francisco de Paula Bueno de Azevedo - Fundação Oswaldo Cruz/ Escola Nacional de Saúde Pública/ Núcleo de Tecnologia e Logística em Saúde, Rio de Janeiro, RJ.
Deborah Chein Bueno de Azevedo - Fundação Oswaldo Cruz/ Escola Nacional de Saúde Pública/ Núcleo de Tecnologia e Logística em Saúde, Rio de Janeiro, RJ.
Jocimar Lanes Lima - Fundação Oswaldo Cruz/ Instituto de Tecnologia em Fármacos, Rio de Janeiro, RJ.
Telma Abdalla de Oliveira Cardoso - Fundação Oswaldo Cruz/ Escola Nacional de Saúde Pública/ Núcleo de Tecnologia e Logística em Saúde, Rio de Janeiro, RJ.

ABSTRACT

This article presents a narrative literature review regarding the use of telemedicine related to low vision or subnormal vision in people with loss of function due to any ocular condition. The survey conducted in May 2017 collected a total of 125 articles. After the duplications were removed, 62 articles remained and four relevant articles were selected. Real-time tele-ophthalmology has the potential to reduce the costs and limitations of coverage of services associated with (traditional) face-to-face consultation. Some studies using only the basic videoconference technology present results favoring telemedicine when compared to studies with more advanced telephthalmology equipment.

Keywords: Neoplasias; Xantogranuloma Juvenil; Histiócitos.

RESUMO

Este artigo apresenta uma revisão narrativa de literatura a respeito do uso da telemedicina relacionada à baixa visão ou visão subnormal, em pessoas com perda de função devido a qualquer condição ocular. A pesquisa realizada em maio de 2017 coletou um total de 125 artigos. Após retirada das duplicações restaram 62 artigos e foram escolhidos quatro artigos relevantes. A teleoftalmologia em tempo real tem o potencial de reduzir os custos e limitações de cobertura de serviços associados à consulta presencial (tradicional). Alguns estudos utilizando apenas a tecnologia básica de videoconferência apresentam resultados que favorecem a telemedicina quando comparados a estudos com equipamento mais avançado de teleoftalmologia.

Palavras-chave: Baixa visão; Telemedicina; Deficiência Visual.

RESUMEN

Relatamos un caso excepcional de xantogranuloma juvenil en una niña de 7 años de edad, que se ha presentado por una lesión nodular antiestética de grandes proporciones en el limbo corneoescleral, lo cual le impedía cerrar el ojo izquierdo. El examen histopatológico y la coloración inmunohistoquímica establecieron el diagnóstico. Asimismo, se presentan los detalles que llevaron a un resultado exitoso. Hasta donde llega nuestro conocimiento, ésta es la mayor lesión xantogranulomatosa en el limbo presentada en la literatura hasta la presente fecha.

Palabras Clave: Neoplasias; Xantogranuloma Juvenil; Histiocitos.

Funding: No specific financial support was available for this study.
CEP Approval: Not applicable
Disclosure of potential conflicts of interest: None of the authors have any potential conflict of interest to disclose.
Received on: July 25, 2017
Approved on: December 6, 2017
Corresponding author: Elaine Fonseca Bastos Goulart- email: draelainegoulart@gmail.com - Fundação Oswaldo Cruz/ Escola Nacional de Saúde Pública/ Núcleo de Tecnologia e Logística em Saúde, Rio de Janeiro, RJ. R. Leopoldo Bulhões, 1480 - Bonsucesso, Rio de Janeiro - RJ, 21041-210

How to cite: Goulart EFB, Azevedo FPB, Azevedo DCB, Lima JL, Cardoso TAO. Abordagem da Telemedicina em Baixa Visão. eOftalmo. 2017; 3(4) 6-10.
http://dx.doi.org/10.17545/eOftalmo/2017.109

INTRODUCTION

There are an estimated 285 million people with visual impairment worldwide, and 246 million of them have low vision.[1] According to the World Health Organization (WHO), a person with low vision is one who has functional impairment even after clinical and/or surgical treatment and has a visual acuity of less than 20/60 and greater than 20/400 or a visual field of less than 20º from the point of fixation in the better eye with the best correction.[2]

People with early-stage low vision may require less magnification, benefiting in some cases from the observer simply moving closer to the reading material. It may also be easier to use assistive technologies and to maintain more prolonged contact with the specialist, lowering or preventing stress, anxiety, or depression, which interfere with visual rehabilitation[3].

Telehealth is related to activities associated with healthcare, wherein information services, technologies, and telecommunications are used for health promotion. Some studies distinguish between telemedicine and telehealth, with the former being restricted to the provision of services only by physicians.[4] Telemedicine promotes access for people in remote areas where specialized healthcare is unavailable[5] and can benefit people with low vision through real-time internet-based remote consultations with the ophthalmologist (teleophthalmology) as well as rehabilitation with optical, non-optical, and electronic aids (visual telerehabilitation), reducing the time and cost of transporting the visually impaired person and their companions and contributing to social inclusion.

Some teleophthalmology applications are screening for diabetic retinopathy and retinopathy of prematurity, anterior segment imaging (corneal diseases or lesions, cataract, hyphema, and uveitis), glaucoma screening, low vision consultation, and teleguidance (surgical procedures).

The aim of this study was to map the “state of the art” or “state of knowledge” of academic research on telemedicine related to low vision and to summarize relevant articles and the quantitative approach of scientific research. The method used was a non-systematic literature review, aiming to identify scientific studies on telemedicine related to low or subnormal vision in people with loss of function due to any eye condition.

METHOD

A non-systematic literature review was conducted on databases such as PubMed, MEDLINE, EMBASE, ClinicalTrials.gov (www.clinicaltrials.gov), and WHO International Clinical Trials Registry Platform (ICTRP) (www.who.int/Ictrp/search/en). No study design filter was used in the electronic searches.

The following search terms were used: “telemedicine” AND “low vision,” “teleophthalmology” AND “low vision,” “telehealth” AND “low vision,” “telerehabilitation” AND “low vision,” “e-health” AND “low vision,” “telemedicine” AND “subnormal vision,” “teleophthalmology” AND “subnormal vision,” “telehealth” AND “subnormal vision,” “telerehabilitation” AND “subnormal vision,” and “e-health” AND “subnormal vision.”

Endnote X8 was used to collect, organize, and store the references and to remove duplicate entries.

The inclusion criteria used to select the articles were as follows: a) not written by the authors of the present study to ensure neutrality and impartiality; b) based on academic studies on telemedicine in which the participants were diagnosed with low vision, as defined by WHO; c) based on studies conducted from 2005 (use of videoconferencing for patients with low vision) to 2017; d) addressing a topic related to the researched keywords; e) written in Portuguese or English, whichever language the authors are most fluent in; f) for which the authors of the present study had access to the full text; and g) based on academic studies in indexed journals.

The exclusion criteria used were a) academic studies prior to the period studied; b) academic articles wherein the objective of the study was not related to the search terms; c) articles written in languages other than Portuguese or English; d) lack of access to the full text to the authors of the present study; and e) academic studies published in non-indexed journals.

Two authors screened the titles and abstracts independently and then screened the articles in full, taking into account the eligibility criteria. Two authors were responsible for the abstracts and two others for the inclusion of the studies. There was no disagreement among the authors.

RESULTS

The survey was conducted in May 2017 and collected a total of 125 articles. After removing duplicate articles, 62 articles remained, and two authors chose four relevant articles (Figure 1), accounting for a total of four summarized articles. After reading the full text of the article, the authors were in full agreement on the selection, considering the inclusion and exclusion criteria.

The four eligible articles are summarized in Table 1 (below).

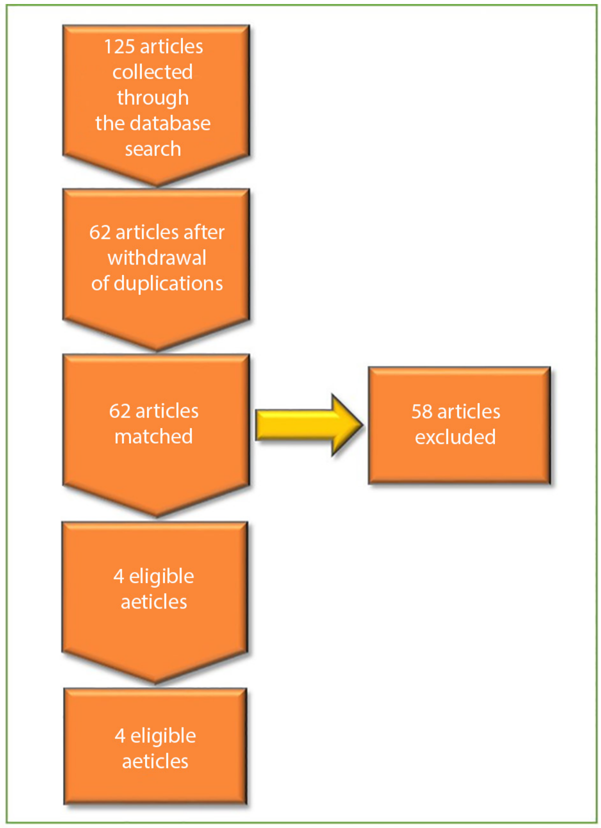


Figure 1. Study flowchart
Source: Own.

Table 1. Summary of eligible articles.

Tang et al. 2005	The authors reported improved access to specialized care that was not available in unobserved areas, enabling consultation through teleophthalmology without the need to transport patients to the University of Texas (Houston) Low Vision Center.[6]
Crossland et al. 2014	Tablet used by 64 (48%) of 132 people with low vision or amaurosis. 81% used a smartphone 51% used the camera and screen as a magnifier.[7]
Ihrig 2014	Real-time experience with remote subjects living in rural areas: use of technologies to target care. Facilitated access to visual rehabilitation with positive feedback from participants.[8]
Bittner et al. 2015	Literature review on telerehabilitation for people with low vision using the Systematic Review Data Depository (SRDR) (http://srdr.ahrq.gov/). Inclusion criteria: randomized controlled trials, controlled clinical trials, and non-randomized studies (cohort studies and case series). No study was eligible for this review.[9]

Source: Own.

Of these studies, Tang *et al.* (2005) and Ihrig (2014) made use of clinical videoconferencing (Figure 2) and visual rehabilitation (Figure 3) as follows:

DISCUSSION

Low vision due to conditions such as age-related macular degeneration and diabetic retinopathy makes traveling and driving vehicles difficult and may be a barrier preventing people with visual impairment living in distant or rural locations from having a consultation with the specialist physician and visual rehabilitation facilities.

Teleophthalmology broadens access to low-vision consultations (reducing the need to travel) and enables visual rehabilitation as early as possible, maximizing patient skills, with follow-up focused on training with optical, non-optical, and electronic aids (visual telerehabilitation).

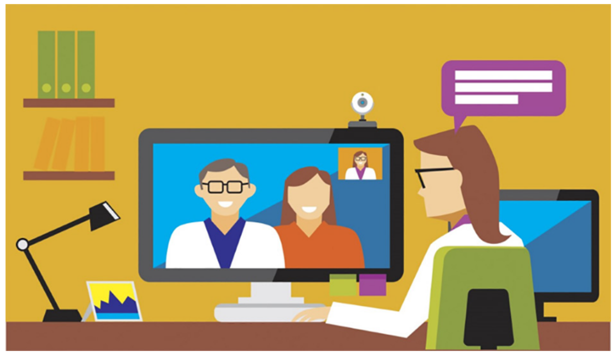


Figure 2. Videoconference: clinical video telemedicine.
Source: Own.



Figure 3. Videoconference: clinical video visual telerehabilitation.
Source: Own.

The challenges to be faced are tests unsuitable to be performed through clinical video telemedicine (visual acuity, refraction, ocular health assessment, confrontation visual field, and others) as well as the need to develop a trained team with local primary care ophthalmologists. Teleconsultation is a possibility for health professionals in rural and remote locations using currently available technology. The effectiveness of this interaction, however, depends on the internet transmission speed, especially when needed for remote examination.[10]

Therefore, low vision consultation and visual telerehabilitation require the results of visual acuity examinations for both near and distance vision and both with and without the best correction, visual field tests (confrontation, either manual or computerized), and other relevant tests; current diagnoses and treatments; as well as equipment and an adequate internet speed.

Real-time teleophthalmology has the potential to reduce the costs and limitations of service coverage associated with (traditional) face-to-face consultation. Some studies using only basic videoconferencing technology[11,12] are similar in terms of the results of diagnostic accuracy, which favor telemedicine when compared with studies using more advanced teleophthalmology equipment.[13,14]

Due to the difficulties faced by people with visual impairments without habilitation/rehabilitation and the interest in telemedicine as a means of reducing the travel barrier, enabling an increase in accessibility, future studies to explore the potential of telemedicine as a platform to provide remote services to people with low vision are promising. In addition to promoting partnerships with national and international institutions, such studies may also form collaborative networks and develop a structure of innovation and sustainability in telemedicine for solution research and development.

REFERENCES

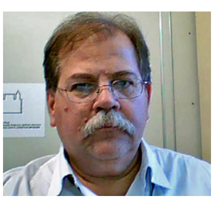
1. World Health Organization - WHO. Visual impairment and blindness. [cited 2017 Jun 18]. Available from: http://www.who.int/mediacentre/factsheets/fs282/en/
2. World Health Organization - WHO. Vision 2020 the Right to Sight. Global Iniciative for the elimination of avoidable blidness: Action plan 2006-2011. [cited 2017 Jun 18]. Available from: http://apps.who.int/iris/handle/10665/43754
3. Gartner S, Schwartz SG, Scott IU. Collaborating with low vision specialists: Knowing when to refer to a low vision expert may enable patients with vision impairment to lead more independent, happier lives. Retina Today. 2016 Sep;74-6.

4. World Health Organization - WHO. Telemedicine. Opportunities and developments in Member States. Report on the second global survey on eHealth Global Observatory for eHealth series - Volume 2. [cited 2017 Jun 18]. Available from: http://www.who.int/goe/publications/goe_telemedicine_2010.pdf
5. Sharma LK, Rajput M. Telemedicine: socio-ethical considerations in the Indian milieu. Med Leg J. 2009;77(Pt 2):61-5.
6. Tang RA, Morales M, Ricur G, Schiffman JS. Telemedicine for eye care. J Telemed Telecare. 2005;11(8):391-6.
7. Crossland MD, Silva RS, Macedo AF. Smartphone, tablet computer and e-reader use by people with vision impairment. Ophthalmic Physiol Opt. 2014;34(5):552-7.
8. Ihrig C. Rural Healthcare Pilot Clinic: Low Vision Clinical Video Telehealth. Optometric Education. 2014;40(1):14-6.
9. Bittner AK, Wykstra SL, Yoshinaga PD, Li T. Telerehabilitation for people with low vision. Cochrane Database Syst Rev. 2015;8:CD011019.
10. Tan IJ, Dobson LP, Bartnik S, Muir J, Turner AW. Real-time teleophthalmology versus face-to-face consultation: A systematic review. J Telemed Telecare. 2017;23(7):629-38.
11. Rayner S, Beaconsfield M, Kennedy C, Collin R, Taylor P, Murdoch I. Subspecialty adnexal ophthalmological examination using telemedicine. J Telemed Telecare. 2001;7 Suppl 1:29-31.
12. Dawson E, Kennedy C, Bentley C, Lee J, Murdoch I. The role of telemedicine in the assessment of strabismus. J Telemed Telecare. 2002;8(1):52-5.
13. Tan JC, Poh EW, Srinivasan S, Lim TH. A pilot trial of tele-ophthalmology for diagnosis of chronic blurred vision. J Telemed Telecare. 2013;19(2):65-9.
14. Tanabe N, Go K, Sakurada Y, Imasawa M, Mabuchi F, Chiba T, et al. A remote operating slit lamp microscope system. Development and its utility in ophthalmologic examination. Methods Inf Med. 2011;50(5):427-34.



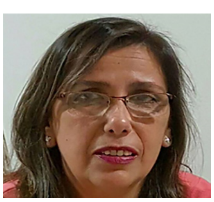
Elaine Fonseca Bastos Goulart

http://orcid.org/0000-0002-2461-7385
http://lattes.cnpq.br/0769179867095286



Francisco de Paula Bueno de Azevedo

http://orcid.org/0000-0002-7815-0178
http://lattes.cnpq.br/4353110910043589



Deborah Chein Bueno de Azevedo

http://orcid.org/0000-0002-9768-4757
http://lattes.cnpq.br/0591950483425739



Jocimar Lanes Lima

http://orcid.org/0000-0002-0168-6839
http://lattes.cnpq.br/4603347538368851



Telma Abdalla de Oliveira Cardoso

http://orcid.org/0000-0002-5430-7273
http://lattes.cnpq.br/5846008743651694